# Appendix 3

## Abstracts :

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### CONSTRUCTION AND FUNCTION OF FULLY ELECTRICAL DNA-CHIPS

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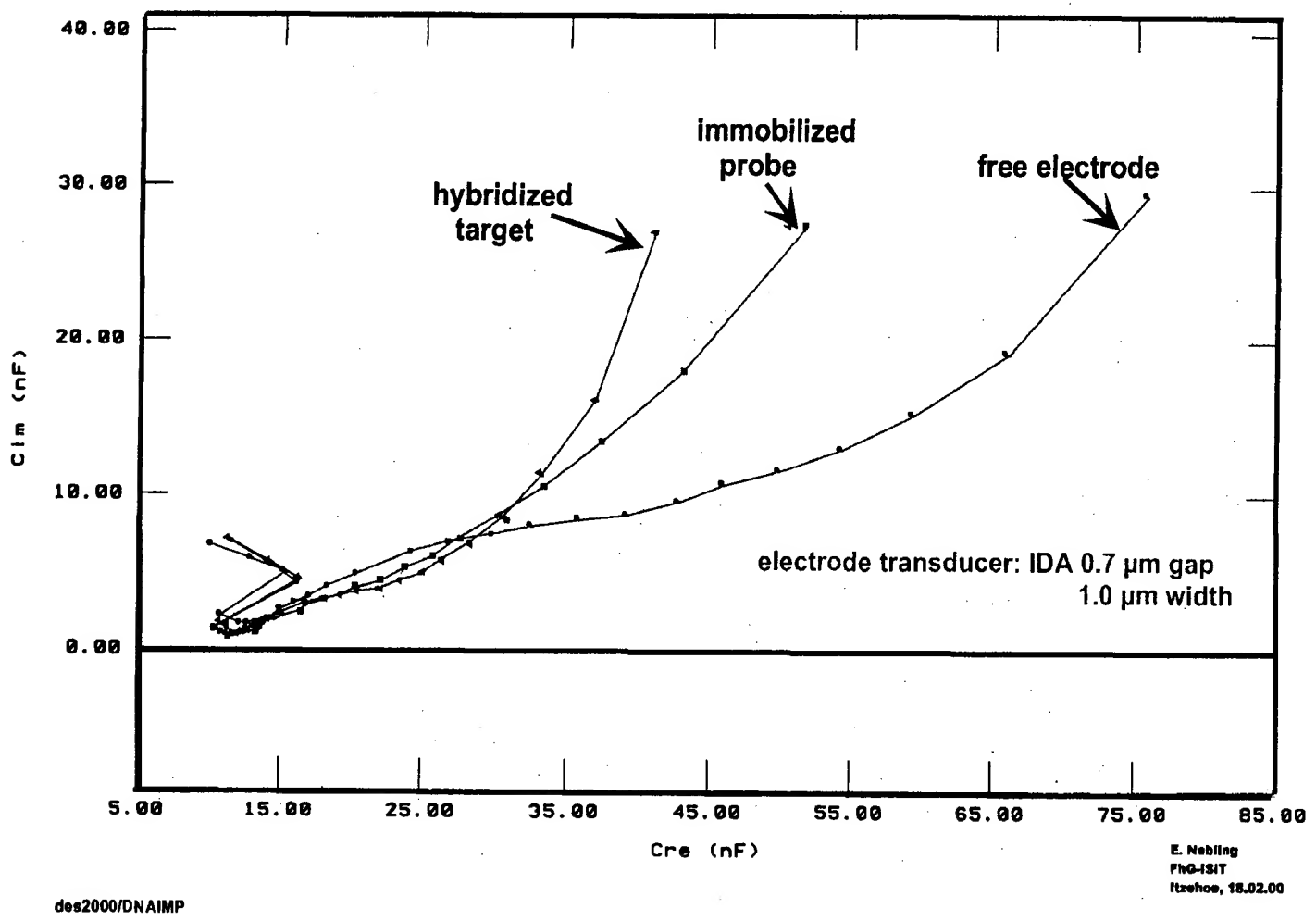
In the last decade some efforts have been made in the construction of fully electrical chip-arrays. The equipment commonly used for voltammetric measurements in multi channel electrode arrays are potentiostats, which are usable for parallel and simultaneous read out. The conditioning and charging of electrodes due to the formation of their electrical double layers did not allow multiplexing of current responses.

Now multiplexing and serial read out was realized by special constructed switches which we have integrated in a CMOS ASIC. Here the potentials have been applied to the electrodes as well during the read out as during stand by, where a separate bias line is used. A multiplexing of electrode arrays in the millisecond range while measuring currents in picoamperes is achieved without any disturbance of the electrical double layer.

This measurement procedure has been applied to the redox recycling of DNA-ELISA's. The immobilization of catching oligonucleotides to different positions of the multi channel interdigitated electrode arrays enabled a multi component analysis. There is a balance between the immobilized molecules on the sub-µm electrode surface and the access of enzyme labeled products to free electrode surface.

Additionally a simple approach is described, where the hybridisation of target DNA to the immobilized oligonucleotides was done on polymeric beads in several separated micro containments. Each containment forms a flow cell, where interdigitated electrode arrays are installed.

# Label free detection of cytokeratin 20 by impedance spectroscopy




**immobilized ONT -probe:** T*T*T* T*T*T* T*T*T* T*--CG ATC TGT TTT ATG TAG GGT TAG GTC A

**target CK 20 sequence:** (biotin-) TGA CCT AAC CCT ACA TAA AAC AG

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# application:

## cytokeratin 20

T*T*T* T*T*T* T*T*T* T*--
-CG ATC TGT TTT ATG TAG GGT TAG GTC A

ONT -probe

(biotin-) TGA CCT AAC CCT ACA TAA AAC AG

CK 20 sequence